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of a great bird colony. Thus in attempting to indicate something of the life of the Albatross I have wholly failed to include the subtle charm which reaches one through the soft tropical sky, the salty breeze, the sparkling lights on waves, now green now purplish, as they break on the coral reef; and the wilder scenes in the tossing surges that assail the eastern shore with booming roars and clouds of flying spray; and the darting, screaming multitude of sea fowl gleaming their living prey from the tumult of waters, or winging their certain way to the expectant nestlings. Every sight and sound leaves a lasting impression, and yet, perhaps, it will be the *mystery* of those myriads of sentient beings that will linger when all else has been forgotten.

NESTING HABITS OF THE HERODIONES IN FLORIDA.

BY A. C. BENT.

Plates IX and X.

DURING the past two seasons, April and May, 1902 and 1903, I have had excellent opportunities to study the nesting habits of all the species of this order known to nest within the limits of the State of Florida, with the exception of the Glossy Ibises and the Reddish Egret, the former being very rare in the regions visited, and the latter being practically confined to the Florida Keys where it is by no means common. The season of 1902 was spent in Brevard County, at various points along the Indian River from Titusville to Sebastian, and in the interior, among the marshes and cypress swamps of the upper St. Johns River, this latter locality proving most fruitful. The river at this point is spread out over a marshy area about three miles wide with a narrow open channel and a series of small lakes or ponds in the center. Except in these open places the water is very shallow, from one

to three feet deep, with a treacherous muddy bottom, making wading impossible. The marsh consists of broad areas of saw grass among which are numerous tortuous channels overgrown with a rank growth of coarse yellow pond lilies, locally known as 'bonnets,' through which we had to navigate by laboriously poling a shallow, pointed skiff. The channels are still further choked by small floating islands, made up of bushes and rank aquatic vegetation, which drift about more or less with the changes of the wind. There are also many permanent islands overgrown with willows which serve as rookeries for thousands of Louisiana Herons, Little Blue Herons, Anhingas, and a few Snowy, Black-crowned and Yellow-crowned Night Herons. Least Bitterns, Red-winged Blackbirds and Boat-tailed Grackles nest in the saw grass, Coots, Purple and Florida Gallinules, frequent the 'bonnets,' and large flocks of White Ibises, Wood Ibises, Cormorants and a few Glossy Ibises fly back and forth over the marshes, especially at morning and evening.

The season of 1903 was spent in the extreme southern part of the State, cruising in a small schooner from Miami to Cape Sable, visiting nearly all of the keys and making several trips inland to the southern edge of the everglades in Monroe County.

The whole of the Bay of Florida, from the outer keys to the mainland, is extremely shallow, so that cruising in a boat drawing more than three feet of water is out of the question; I should say that fully one half of the bay would average less than three feet deep; the bottom is covered with soft, slimy, whitish mud which discolors the water and at certain times makes it quite opaque. There are three types of keys in this region, mud keys, sand keys, and coral keys. The mud keys are by far the commonest type, the natural result of the prevailing conditions, and they are constantly increasing in size and number. They owe their origin and their increase to the agency of the red mangroves and their long-tailed seeds, which float about until they find a foothold in the mud where they germinate and grow to maturity, spreading out from year to year over more and more territory until an incipient key is formed. This incipient key is locally known as a 'bush,' having no dry land under it, the trees growing in water from one to three feet deep. As the key grows older and dry

land forms, the red mangroves in the centre are gradually replaced by black mangroves.

On some of the largest, and probably the oldest, keys there are dry, open areas overgrown with grasses and underbrush, the red mangroves remaining only in a narrow strip around the shores.

There are very few sand keys, which are merely modified mud keys, having beaches of coarse shelly sand replacing the mangroves for portions of their shore line. Most of the outer and lower keys are of coral formation; they are the most picturesque, the most interesting and the most tropical in appearance of all the keys. They are but scantily covered with a thin, light soil, the coral rock showing through it everywhere, but they generally support a rich tropical vegetation, consisting of cocoanut palms, tamarinds, sapadillos, oranges, lemons, limes, bananas, pine-apples, pawpaws, sisal and various cacti. On the larger keys the edible fruits are largely cultivated by the native 'conchs' and negroes.

The mainland, for many miles into the interior, is low and flat; the lakes and streams are shallow and brackish; and the absence of any good drinking water, together with the omnipresent swarms of mosquitoes, make collecting in the interior anything but a pleasure. Red mangroves line the shores of all the lakes and streams, and the forests consist mainly of black and white 'buttonwoods,' black mangroves and a few rubber trees. There is a narrow strip of prairie along the southern coast of Monroe County, between the muddy shore and the forest, and at Cape Sable there is a long stretch of high, sandy beaches, these two being the only habitable localities on the mainland.

I shall now take up the various species of the Order Herodiones, giving my experience with them, as I found them in Florida, without attempting to describe their habits or distribution elsewhere.

Ajaia ajaja. ROSEATE SPOONBILL.

This beautiful species, which must be seen in life to be appreciated, is confined, during the breeding season at least, to the extreme southern portions of Florida. The Spoonbills are



FIG. 1. NEST AND YOUNG OF ROSEATE SPOONBILL.



FIG. 2. NEST AND EGGS OF ROSEATE SPOONBILL.

fairly abundant on the southern coasts of Florida during the winter, feeding in large flocks in the shallows of the Bay of Florida, in the muddy inlets along the shore, and in the shallow lakes and sloughs in the interior. One of their favorite feeding grounds is a large, so-called 'slough' near Cape Sable, but very different in character from the typical western prairie slough. This is apparently a submerged forest, killed by inundations from the sea, the remains of which are still standing, tall dead trees, many of them of large size, bare and bleached. During the fall and early winter the slough is full of water but at the time we were there, in April, it was partially dry in spots, but mostly soft and boggy, with sluggish streams and numerous shallow muddy pools scattered through it, forming fine feeding grounds for Spoonbills, Ibises and other water birds. There is another favorite resort of the Spoonbills on one of the keys which has a fair sized lake in the centre. Large flocks of 'Pink Curlews', as they are called by the natives, had been seen almost daily flying to and from this lake. Owing to this fact we were lead to suppose that we might find a breeding rookery here, but a day's search failed to reveal even a single bird. I am inclined to infer that they come here only to feed in the shallow muddy waters of the lake or to roost in the mangroves around it.

We found the Roseate Spoonbills breeding in only two localities, in large mixed rookeries with several other species. The first locality was a small island, not over two acres in extent, in the centre of a large lake in the interior, Cuthbert Lake, about seven miles back from the coast and almost on the edge of the everglades. It was covered with a thick growth of black mangroves, mixed with white 'buttonwoods' and a few black 'buttonwoods,' in the centre and surrounded by a wide belt of red mangroves growing in the mud and water up to three feet in depth.

As we approached the island an immense cloud of birds arose, with a mighty roar of wings, and circled about us in a bewildering mass. We estimated that there were at least 4000 birds nesting on the island, principally White Ibises and Louisiana Herons, with a great many Little Blue Herons, Anhingas and Florida Cormorants, and a few American Egrets. But conspicuous among them all was a little party of twelve Roseate Spoonbills;

they perched for a few moments in the mangroves, their gorgeous nuptial plumage showing to advantage against the dark green foliage, then rose, gradually circling higher and higher, the sun illuminating their delicately rose-colored wings, as with outstretched necks and legs they seemed to fade away into the sky. We did not see them again that day.

Though we searched carefully and thoroughly, we found only three of their nests. These were all built in red mangrove trees on the edge of the water among the nests of the White Ibises; they were all on nearly horizontal branches, from 12 to 15 feet from the ground, and were all similar in size and construction, easily distinguishable from the others. They were larger than the Ibises' nests or the smaller Herons' nests and about as large as the Anhingas' nests, but more neatly made than the latter, without the use of dead leaves, which are so characteristic of the Snakebirds' nests; they were well made of large sticks, deeply hollowed and lined with strips of bark and water moss. One nest contained only a single, heavily incubated egg, one a handsome set of three eggs, and the other held two downy young, not quite half grown.

The single egg has a dirty white ground color with only a few irregular blotches of raw umber and mummy brown about the larger end; it measures 2.58 by 1.72 inches, being somewhat elongated ovate in shape. The set of three eggs have a pinkish, creamy white ground color, more or less uniformly covered with dashes and spots of lavender, purple and drab, over which spots of various shades of brown are quite evenly distributed.

The eggs somewhat resemble those of the White Ibis, but can always be easily distinguished by their larger size; they will average one quarter of an inch larger each way.

The two young, in the feeble, helpless stage, unable to stand as yet, were curious looking birds, flabby and fat, with enormous abdomens and soft duck-like bills; their color, including bill, feet, legs and entire skin, was a beautiful, deep, rich salmon pink; they were scantily covered with short white down which was insufficient to conceal the color of the skin; the wing quills were well started, but still in sheaths. The first plumage, acquired before the young leave the nest, is mainly white with a slight suffusion of pink under the wings and tail.



FIG. 1. NEST OF WHITE IBIS.



FIG. 2. NEST AND EGGS OF WHITE IBIS.

The principal breeding ground of the Roseate Spoonbills was a great morass on the borders of Alligator Lake, a few miles back from the coast near Cape Sable, where the mangrove islands in which the birds were nesting were well protected by impenetrable jungles of saw grass, treacherous mud holes, and apparently bottomless creeks. The various members of the heron family were nesting here in countless numbers, White Ibises, Roseate Spoonbills, Louisiana Herons, Snowy Herons, and American Egrets; one might toil here for many hours and never get beyond the sea of nests and hosts of young birds in all stages of growth; the area was too vast and the traveling too difficult to arrive at any reasonably accurate estimate of the numbers of birds breeding in this great rookery. The Spoonbills were here in abundance and had eggs and young in their nests in all stages, as well as fully grown young climbing about in the trees. The old birds were tamer here than at Cuthbert Lake, and even allowed themselves to be photographed at a reasonable distance.

The Spoonbills will probably be the next to disappear from the list of Florida water birds; they are already much reduced in numbers and restricted in habitat; they are naturally shy and their rookeries are easily broken up. Their plumage makes them attractive marks for the tourist's gun, and they are killed by the natives for food. But fortunately their breeding places are remote and almost inaccessible; and through the earnest efforts of the A. O. U. wardens they are now protected. It is to be hoped that adequate protection in the future will result in the preservation of this unique and interesting species.

Guara alba. WHITE IBIS.

The White Ibis, or 'White Curlew' as it is called by the natives, is universally abundant throughout all portions of Florida that I have visited, but especially so in the southern portions of the State. Both this and the preceding species are highly esteemed by the natives as food; the old birds are shot at all seasons and the young are taken from the nests in large numbers.

The 'conchs' and negroes of southern Florida also eat the young of all the smaller herons and do not draw the line even at young cormorants.

On the upper St. Johns we saw large flocks of White Ibises daily, flying to and from their feeding grounds at morning and at evening; we also found them feeding in large numbers in the shallow pools in the cypress swamps, but we were not able to locate any breeding rookeries in this region.

In Monroe County they were the most abundant species of the order, breeding in immense colonies of countless thousands. We found them on all the inland lakes and streams, feeding in the shallow, muddy lakes and flying out ahead of us as we navigated the narrow creeks.

The first breeding colony we found was in the Cuthbert Lake rookery referred to above; as we approached the little island the Ibises arose in a great white cloud from the red mangroves and circled about over our heads, uttering their peculiar grunting notes of protest. We estimated that there were about 1000 Ibises in the colony. They soon settled down into the trees again where we landed and were constantly peering at us through the foliage while we were examining their nests.

The Ibises' nests occupied the intermediate belt, on the outer edge of the larger trees on the dry land and on the inner edge of the red mangroves over the mud and shallow water, the interior of the island being occupied by the herons and the outer edge of the mangroves by the cormorants.

The nests were rather closely grouped, at heights varying from 8 to 15 feet, on the horizontal branches of the mangroves, often on very slender branches; only a few were placed in the white 'buttonwoods.' They were very carelessly and loosely made of dry and green leaves of the mangroves, held together with a few small sticks and lined with fresh green leaves. The nests are probably added to as the eggs are laid or as incubation advances.

The nests which contained only one egg were very small, flimsy structures, hardly large enough to hold the egg, often measuring only 6 inches across, while those with three eggs were larger, 10 inches or more across, and better made. They generally lay four or five eggs, and in such cases have large and well built nests. At the time of our visit, May 1, 1903, the Ibises in this rookery were only just beginning to lay, as most of the nests contained one or two eggs, none more than three, and all the eggs we collected were fresh.

This was rather remarkable, considering that fifteen days later, at Alligator Lake, where these Ibises were breeding in immense numbers, they had young of all ages, many of them able to fly.

There are several very large breeding rookeries of White Ibises on the lower west coast of Florida which we did not have time to visit, but we were told by our guides that they are much larger than any we had seen.

The eggs of the White Ibis are subject to great variation in size, shape, and color, making a handsome series. The ground color varies from pale blue to dull white or deep cream color. Some of the eggs are nearly immaculate, with a few small spots or blotches of various shades of brown. Some are boldly spotted or heavily blotched with chestnut or chocolate brown, and some profusely washed or stained with russet or burnt sienna. In shape they vary from ovate to elongate ovate.

A series of six sets selected at random exhibit the following measurements: length, 2.47 to 2.17; breadth, 1.61 to 1.47; average, 2.33 by 1.53 inches.

The White Ibises are so extremely abundant that there seems to be but little danger of their extermination, at least for a long time to come, in spite of the fact that they are shot in large numbers by sportsmen and tourists, as well as by the residents for food. Their rookeries are generally difficult of access, and they are not sought after by the plume hunters.

Tantalus loculator. WOOD IBIS.

This interesting species is fairly common in nearly all the fresh water lakes and marshes in the interior of Florida, and, owing to its large size and striking colors, is always conspicuous. During the winter months it is abundant all along the Indian River, where it may be seen in large flocks along the muddy shores feeding on small crustacea and batrachians; its actions at such times are grotesque and amusing as it dances along over the mud, beating the ground with its feet to drive the little crabs from their holes. As the breeding season approaches the Wood Ibises disappear from their winter feeding grounds and resort to the cypress swamps in the interior to breed. There are several small breeding rookeries

a few miles back from the coast along the Indian River in Brevard County, where they nest in small cypress swamps.

In the big cypress swamps in the upper St. Johns region there are more extensive rookeries. We saw the birds here frequently flying to and from their rookeries, especially at morning and at night, in long lines high in the air, alternately flapping their wings or sailing, all in perfect unison, and all following their leader with military precision. Their pure white plumage, contrasted with their jet black remiges served to identify them at a long distance.

Sometimes we saw them sailing about in great circles high above us, their necks and legs outstretched and their long wings motionless, giving a fine example of their wonderful wing power.

They were extremely wary, and, except in their breeding rookeries, they never came near us or allowed us to approach within gunshot. Their nests were placed in the tops of the tallest cypresses, and far out on the horizontal limbs, in the very heart of the big cypress swamp. The trees here were the largest I have ever seen, measuring six feet or more in diameter at the base, tapering rapidly to about three feet in diameter, and then running straight up at about that size for seventy-five or one hundred feet to the first limb. The nests were practically inaccessible by any means at our disposal, so we remained in ignorance as to their contents.

In Monroe County we were more fortunate, as the absence of cypress swamps in this region compelled the Wood Ibises to nest in smaller trees. We found a small colony of Wood Ibises breeding on an island in Bear Lake, about two miles back from the coast. The birds were very shy, leaving the island when we were about one hundred yards away, and not coming within gunshot afterwards. There were about twenty nests in the tops of the red mangroves, from twelve to fifteen feet from the ground; they were large nests, about three feet in diameter, made of large sticks, very much like the nests of the larger herons, and were completely covered with excrement. All the nests held young birds in various stages of growth, covered with white down; only the foreheads were naked. The bills were pale yellow, the eyes dark and the feet pale flesh color. They were grotesque looking objects, squawking loudly to be left alone. A party of Fish

Crows made their lives miserable as long as their parents were away.

The Wood Ibises are not in need of protection; they are extremely shy and wary and well able to take care of themselves; they are not sought after by the plume hunters and are useless for food.

Plegadis autumnalis. GLOSSY IBIS.

I have very little to add to the life history of this species in Florida where it is undoubtedly rare and of local distribution. We saw a few Glossy Ibises flying over the marshes of the upper St. Johns, but found no evidence of their breeding there.

The White-faced Glossy Ibis has been once recorded from this vicinity near Lake Washington, where a female was shot on a nest containing three eggs (see Brewster, Auk, III, 1886, p. 481). We were unable to shoot any of the birds we saw and therefore could not determine the species with certainty. In Monroe County we saw only one flock of five birds flying over, high in the air, at Lowes Lake near Cape Sable. Our guides told us that they were rarely seen, and none of the guides with whom I corresponded seemed to know them at all.

SUMMER BIRDS OF THE LEECH LAKE REGION, MINNESOTA.

BY EDMONDE S. CURRIER.

IN 1902 I was in this region from May 26 to June 10, and again, in 1903, from May 22 to June 8. Almost the entire time was devoted to the birds, particular attention being given to the breeding species.

I made my headquarters in the little city of Walker during both visits. In 1902 I was by myself the greater part of the time, but